

Positions of Nova Persei and 159 Stars within 25' distance from it. From a Photograph taken at the University Observatory, Oxford. By F. A. Bellamy, F.R. Met. Soc.

After the receipt of the telegram announcing the discovery of the new star in *Perseus* the weather in Oxford was unfavourable, but on February 25, though very cloudy, there were rifts in the clouds, during which I saw *Nova* at its full brilliancy, and though the star was invisible to the eye most of the time the exposures were made, I was able to secure two plates with seven exposures, between 10^s and 13^m exposure, the star being visible all the time in the 12 $\frac{1}{4}$ -inch refractor, used as a guiding telescope for astrographic work, sometimes as faint as a third or fourth magnitude star.

The plates taken were—

1727. Exposures, 10^s, 2^m, 2^m, 15^s between Oxf. Sid. T. 5^h 13^m 7^s and 5^h 21^m 17^s.

1728. Exposures, 220^s, 8^m, 13 $\frac{1}{4}$ ^m between Oxf. Sid. T. 6^h 20^m 7^s and 6^h 56^m 42^s.

On the second plate a trail for ten minutes was also given.

Plate 1728 was measured by Mr. E. A. Gray, with the glass scale micrometer, in one of the instruments used for the astrographic catalogue, first in the direct, then in the reversed position, so as to eliminate personality, and all three exposures were measured for the stars used in determining the plate constants and the *Nova*; but for the other stars given in the subjoined catalogue only the second and third exposures were measured, the majority of the faint stars not being visible with the short exposure, owing to cloud.

The places of all stars which could be found in the Bonn A.G. Catalogue ($+40^{\circ}$ to $+50^{\circ}$) within the area covered by the plate were brought to the epoch 1900.0, and standard coordinates (ξ and η), with reference to the adopted plate centre R.A. 3^h 25^m +44° 0', were computed by means of the formulæ given in *Monthly Notices*, liv. II.*

The Oxford measures x , y (reckoned from the corner of the réseau, not the centre) were compared with these coordinates, equations formed and solved in the usual way, and the constants were found to be—

$$\begin{array}{cccccc} a & b & c & d & e & f \\ & & \text{R.I.} & & & \text{R.I.} \\ +\cdot00031 + \cdot00539 - 14\cdot3491 & & -\cdot00528 + \cdot00031 - 14\cdot3797 \end{array}$$

where $\xi = x(1+a) + by + c$, $\eta = dx + (1+e)y + f$.

In Table I. are collected these computed R.A.'s and Dec.'s, the corrections deduced from this plate, and the Oxford standard coordinates ξ' and η' . This information may be useful to others.

* Tables for simplifying the use of these formulæ for 0° to 75° have been prepared and will soon be printed.

TABLE I.

Bonn A.G.C.	Mag.	R.A. 1900'0.			Oxf.- Bonn.	N. Dec. 1900'0.			Oxf.- Bonn.	$\xi' = \xi + 13.$	$\eta' = \eta + 13.$
		h	m	s	s	°	'	"		R.I.	R.I.
2883	7.9	3	20	8.46	-0.04	43	18	19.0	+0.7	2.3894	4.7425
2892	9.0	3	20	32.68	-0.09	43	22	27.4	+1.8	3.2801	5.5618
2895	8.6	3	20	54.84	-0.02	43	49	37.7	-1.0	4.1556	10.9769
2898	8.3	3	21	13.98	+0.15	44	2	31.5	+0.4	4.8816	13.5527
2899	9.0	3	21	14.69	+0.04	43	59	31.6	-2.2	4.8964	12.9441
2906	7.2	3	21	29.67	+0.12	44	1	43.7	+0.3	5.4429	13.3870
2907	8.9	3	21	34.92	0.00	43	38	39.2	+0.3	5.5797	8.7697
2911	7.7	3	21	46.67	0.00	43	24	21.3	-0.4	5.9765	5.9035
2913	8.2	3	21	52.65	+0.01	44	18	3.0	-0.3	6.2959	16.6410
2919	8.4	3	22	22.44	+0.08	44	42	9.6	-0.7	7.4030	21.4528
2944	8.7	3	23	44.27	0.00	44	29	19.3	-0.1	10.2986	18.8695
2948	9.0	3	24	3.23	-0.06	43	38	29.4	+0.7	10.9438	8.7031
2953	9.0	3	24	17.74	-0.15	43	51	59.1	-1.0	11.4713	11.3953
2956	8.7	3	24	29.11	-0.04	44	18	43.0	+0.5	11.8935	16.7457
2964	8.5	3	24	47.37	+0.03	44	11	29.7	+0.7	12.5482	15.3013
2968	8.9	3	25	1.70	-0.03	44	3	34.5	+0.2	13.0599	13.7156
2970	9.2	3	25	12.46	-0.03	44	28	18.5	0.0	13.4437	18.6618
2971	9.0	3	25	12.72	+0.12	44	37	16.6	+0.1	13.4569	20.4556
2972	8.8	3	25	14.39	+0.55	43	19	56.2	-1.3	13.5434	4.9831
2973	7.6	3	25	24.80	-0.09	44	29	58.7	+0.2	13.8813	18.9969
2979	6.5	3	25	47.09	+0.04	44	30	56.4	-0.1	14.6804	19.1899
2982	8.9	3	25	58.20	-0.09	43	53	43.4	+0.7	15.0939	11.7500
2983	8.9	3	26	4.87	+0.33	43	25	16.5	+0.4	15.3680	6.0598
2986	8.9	3	26	13.77	-0.02	43	15	45.8	-0.4	15.6855	4.1558
2996	9.1	3	27	3.65	-0.16	43	30	45.2	+0.8	17.4781	7.1669
3004	9.1	3	27	24.91	-0.01	43	24	19.9	-0.2	18.2637	5.8846
3008	9.0	3	27	45.33	-0.15	44	14	52.7	-0.4	18.9162	15.9991
3009	6.9	3	27	50.20	-0.14	44	28	2.0	-1.5	19.0686	18.6283
3016	8.5	3	28	31.81	-0.18	43	30	46.1	+1.1	20.6743	7.1978
3021	8.9	3	28	51.01	+0.04	42	57	22.2	-0.2	21.4566	0.5203
3034	8.9	3	29	56.53	-0.09	43	44	41.3	+0.4	23.7084	10.0187

When two exposures only are used (as in the case of 159 stars in the annexed catalogue) the constants c and f become

$$\begin{array}{c} c \\ \text{R.I.} \\ -14.3473 \end{array}$$

$$\begin{array}{c} f \\ \text{R.I.} \\ -14.4795 \end{array}$$

a, b, d, e remaining sensibly unchanged.

B B 2

These mean measures were corrected for the plate constants, the quantities being carried to the fourth decimal place throughout, and were converted into differences of R.A. and Dec. A catalogue of these stars is given at the end of this paper.

Owing to the great diameter of the image of *Nova* on the plate (35'' to 50'') special care was taken to render the mean measures in x and y as exact as possible. Each image was bisected and two contact measures made in both positions of the plate by Professor Turner, H. F. Mullis, B. Gray, E. A. Gray, and myself. The mean of the whole series of 45 measures each in x and y was taken. The resulting means for 1900.0 are

$$\begin{array}{cc} \xi & \eta \\ \text{R.A.} & \text{R.A.} \\ 12^{\text{h}} 9956 & 9^{\text{h}} 1883 \end{array}$$

which, corrected for constants already mentioned for the mean of three exposures, give

$$\text{R.A. } 3^{\text{h}} 24^{\text{m}} 24^{\text{s}}.12 \quad \text{Dec. } +43^{\circ} 33' 39''.51$$

There appears not to be any star brighter than about the 12th mag., or nearer to the *Nova* than 4', unless the brilliancy of the star, approximately equal to *Aldebaran*, obliterated some faint stars within 30'' of *Nova*. Photographs when *Nova* is below the 6th mag. would soon decide this point. It may be mentioned that photographs taken on February 27 and March 5 do not show other stars nearer.

Some estimations of magnitude have been made, and the following notes are extracted from the note-book.

Feb. 25. 8^h. To the eye the colour was white, with possibly a tinge of yellow. In the 12 $\frac{1}{4}$ -inch refractor the colour appeared as emerald or young grass green. Mag. about 1.3.

Feb. 27. 7 $\frac{1}{2}$ ^h. *Nova* = β *Tauri*, also equal to the brightest star in *Orion's* belt, nearly $\frac{1}{2}$ mag. brighter than α *Persei*.

Feb. 28. 10^h. *Nova* certainly brighter than α *Persei*.

Mar. 1. 7^h. *Nova* = α *Persei* and β *Aurigæ*, slightly fainter than β *Tauri*; colour slightly orange; had not seen this tinge on other nights. Plate taken in a small camera to locate the position of *Nova* in the constellations *Perseus*.

Mar. 5. 7^h *Nova* = δ *Cassiopeiæ*.

Mar. 6. 8^h *Nova* = ϵ *Persei*, or 0.1 or 0.2 fainter; orange.

Mar. 7. 12^h *Nova* = γ and δ *Persei*, less orange in colour.

I should like to express my thanks to Mr. H. F. Mullis, Mr. B. Gray, and Mr. E. A. Gray for assistance they have given beyond the usual hours at the observatory, thus making it possible to get these results completed in so short a time.

The stars in Table II. are situated within about five réseau intervals of the *Nova*, and may serve as points of reference should the star decrease to a fainter magnitude than the tenth. On account of the cloud it is not easy to decide what is the limit of magnitude of these 159 stars; probably, judging from the

number of stars on the whole plate (over 1200), stars of less than the 12th mag. are on the plate.

Col. I. The catalogue number : those with * are independent measures of two exposures of Bonn stars.

2. The measured diameter of the star's image, the quantity given being the mean of four separate measures; unit .001 of a réseau interval.

3-4. The standard coordinates, ξ', η' , for 1900'0; i.e. from the (S.W.) corner of the plate, with centre $3^h 25^m + 44^\circ$.

5-6. The deduced R.A.'s and Dec.'s for 1900.0.

TABLE II.

Ref. No.	Oxford Measured Mag.	ξ'	η'	Deducted			N. Dec. 1900.
		1900'0.	1900'0.	R.A. 1900'0.			
		R.L.	R.L.	h	m	s	
1	7	6.7173	5.2152	3	22	7.22	43 20 56.6
2	6	6.7805	6.8797		22	8.56	29 16.0
3	7	6.8289	2.6972		22	10.88	8 21.6
4	5	6.8762	2.6530		22	12.19	8 8.5
5	12	7.0318	11.2263		22	14.49	51 0.5
6	10	7.1473	8.9722		22	18.20	39 44.6
7	10	7.1594	4.4411		22	19.55	17 5.4
8	6	7.1752	5.1646		22	19.82	20 42.5
9	10	7.2800	2.6128		22	23.26	7 57.4
10	8	7.4228	9.0376		22	25.80	40 4.8
11	11	7.4178	4.7023		22	26.59	18 24.4
12	6	7.7115	2.7717		22	35.05	8 46.0
13	9	7.7523	4.1085		22	35.90	15 27.1
14	7	7.8908	12.1423		22	38.12	55 37.2
15	7	7.8472	4.6643		22	38.40	18 14.0
16	10	7.9722	10.1806		22	40.77	45 48.9
17	7	8.0104	6.5116		22	42.53	27 28.4
18	9	7.9932	2.8825		22	42.75	9 19.8
19	7	8.0550	6.6181		22	43.74	28 0.5
20	9	8.2079	11.8330		22	46.99	54 5.1
21	12	8.2567	5.8006		22	49.44	23 55.6
22	5	8.3181	11.7280		22	50.06	53 33.8
23	12	8.3504	8.3742		22	51.56	36 47.8
24	7	8.3684	4.1699		22	52.81	15 46.7
25	5	8.3830	3.7626	3	22	53.28	43 13 44.6

Ref. No.	Oxford Measured Mag.	ξ' 1900'o. R.I.	η' 1900'o. R.I.	R.A. 1900'o. h m s	Deduced N. Dec. 1900.
26	8	8'4671	5'9987	3 22 55'20	43° 24' 55''5
27	11	8'6731	9'6113	23 0'27	42 59'5
28	8	8'6678	3'7991	23 1'09	13 56'0
29	9	8'7229	11'4830	23 1'34	52 21'1
30	11	8'7189	9'0150	23 1'64	40 0'7
31	8	8'7840	9'6431	23 3'34	43 9'2
32	12	8'7982	11'0677	23 3'50	50 16'6
33	11	8'9406	11'1344	23 7'43	50 36'9
34	11	9'2346	11'6606	23 15'51	53 15'2
35	6	9'1905	3'0091	23 15'55	10 0'0
36	6	9'2458	3'5278	23 16'99	12 35'6
37	12	9'3510	8'4360	23 19'19	37 8'1
38	9	9'4696	11'5707	23 22'04	52 48'6
39	8	9'4789	5'9639	23 23'06	24 46'7
40	8	9'5351	11'4722	23 23'87	52 19'1
41	10	9'8003	2'6865	23 32'31	8 24'1
42	9	9'8423	10'5063	23 32'51	47 29'8
43	5	9'8394	6'0751	23 32'97	25 20'6
44	7	9'9197	10'2003	23 34'69	45 58'1
45	7	9'9569	12'5492	23 35'45	57 42'8
46	13	9'9266	4'4235	23 35'57	17 5'2
47	7	9'9629	12'9249	23 35'57	59 35'6
48	11	10'0321	5'8032	23 38'31	23 59'2
49	6	10'0384	3'8849	23 38'70	14 23'8
50	7	10'0676	7'5783	23 39'09	32 51'8
51	7	10'0665	7'0465	23 39'12	30 12'2
52	6	10'1167	2'9157	23 40'96	9 33'2
53	10	10'3730	3'4441	23 47'93	12 12'0
54	7	10'4252	4'3225	23 49'27	16 35'6
55	8	10'5363	3'6787	23 52'39	13 22'5
56	8	10'6322	3'1005	23 55'07	10 29'2
57	9	10'6929	5'2312	23 56'55	21 8'4
58	8	10'8065	12'7476	23 59'04	58 43'3
59	10	10'8263	7'4506	24 0'03	32 12'7
60	6	10'9199	12'7604	3 24 2'19	43 58 47'2

March 1901.

Nova Persei and 159 Stars.

345

Ref. No.	Oxford Measured Mag.	ξ'	η'	Deduced			N. Dec. 1900.
		1900'o.	1900'o.	R.A. 1900'o.			
		R.I.	R.I.	h	m	s	
61*	23	10°9444	8°7044	3	24	3'19	43 38 30'5
62	8	10°9546	6°9584		24	3 61	29 46'7
63	11	10°9804	3°3903		24	4'60	11 56'5
64	10	11°0230	8°1445		24	5'41	35 42'6
65	19	11°1991	2°4820		24	10'66	7 24'2
66	4	11°2059	2°5950		24	10'84	7 58'1
67	8	11°2278	3°8169		24	11'35	14 4'6
68*	21	11°4723	11°3945		24	17'62	51 57'9
69	8	11°4663	3°4237		24	17'92	12 6'8
70	8	11°5474	11°6873		24	19'69	53 25'7
71	11	11°6986	5°6089		24	24'19	23 2'4
72	8	11°7661	3°2378		24	26'16	11 11'2
73	8	11°7940	10°0356		24	26'61	43 45 10'4
74	12	11°8456	13°2607		24	27'89	44 1 17'9
75	8	11°9859	12°8550		24	31'81	43 59 16'3
76	11	12°0015	12°3662		24	32'26	56 49'7
77	10	12°0193	11°6728		24	32'78	53 21'6
78	6	12°0584	4°6838		24	34'12	18 25'1
79	10	12°1098	11°2389		24	35'31	51 11'5
80	7	12°2113	12°9048		24	38'07	59 31'3
81	7	12°4278	11°3322		24	44'13	51 39'6
82	18	12°4578	2°5827		24	45'14	7 55'0
83	8	12°5403	12°9355		24	47'22	59 40'6
84	6	12°5770	3°0904		24	48'40	10 27'3
85	6	12°7788	3°4829		24	53'93	12 25'1
86	14	12°7893	11°6964		24	54'15	53 28'9
87	6	12°7890	6°6892		24	54'18	28 26'8
88	10	12°8008	3°7202		24	54'53	13 36'2
89	7	12°8111	10°0030		24	54'77	45 0'9
90	6	12°8862	6°8995		24	56'86	29 29'9
91	8	12°8892	8°0304		24	56'94	35 9'2
92	12	12°9841	7°7705		24	59'56	33 51'2
93	9	12°9968	11°6668		24	59'91	53 20'0
94	14	13°2595	9°4534		25	7'18	42 16'0
95	9	13°3642	2°3603	3	25	9'98	43 6 48'3

Ref. No.	Oxford Measured Mag.	ξ' 1900'o. R.I.	η' 1900'o. R.I.	R.A. 1900'o. h m s	Deducted N. Dec. 1900. ° ' "
96	14	13°38'11	4°49'26	3 25 10.47	43 17 27.9
97	6	13°38'43	4°00'44	25 10.55	15 1.4
98*	24	13°54'35	4°98'16	25 14.94	19 54.5
99	7	13°57'78	4°94'49	25 15.89	19 43.5
100	6	13°59'23	12°40'22	25 16.45	57 0.6
101	10	13°6'359	10°36'76	25 17.61	45 20.2
102	11	13°7'104	12°57'63	25 19.74	57 52.8
103	10	13°90'74	6°79'23	25 25.01	28 57.6
104	9	13°96'59	12°99'99	25 26.86	59 59.8
105	6	14°07'01	2°53'59	25 29.32	43 7 40.8
106	6	14°06'10	13°14'92	25 29.51	44 0 44.5
107	7	14°08'00	2°61'06	25 29.60	43 8 3.2
108	20	14°22'95	3°25'84	25 33.72	11 17.4
109	7	14°27'16	5°73'70	25 35.00	23 40.8
110	5	14°32'64	12°87'17	25 36.87	59 21.2
111	8	14°35'98	5°34'92	25 37.40	43 21 44.5
112	12	14°38'56	13°06'64	25 38.53	44 0 19.5
113	9	14°43'94	4°47'20	25 39.55	43 17 21.3
114	15	14°51'52	3°04'29	25 41.55	10 12.6
115	8	14°52'36	3°91'49	25 41.83	14 34.1
116	6	14°59'29	11°05'41	25 44.17	50 15.7
117	8	14°66'87	4°18'86	25 45.83	15 56.2
118	6	14°76'98	3°69'15	25 48.57	13 27.0
119	8	14°79'85	4°83'13	25 49.44	19 8.8
120	12	14°81'20	3°59'03	25 49.72	12 56.6
121	6	14°81'78	6°89'69	25 50.11	29 28.4
122	9	14°82'86	4°11'24	25 50.21	15 33.2
123	12	14°92'75	10°83'43	25 53.43	49 9.5
124	11	14°99'71	2°57'78	25 54.72	7 52.8
125	9	14°99'49	8°23'09	25 55.10	36 8.5
126	9	15°11'12	4°31'40	25 57.99	16 33.4
127*	23	15°09'58	11°75'07	25 58.17	53 44.3
128	11	15°12'87	8°18'36	25 58.79	35 54.2
129	7	15°13'04	7°68'05	25 58.79	33 23.3
130	7	15°12'30	12°05'26	3 25 58.95	43 55 14.8

March 1901.

Nova Persei and 159 Stars.

347

Ref. No.	Oxford Measured Mag.	ξ'	η'	Deduced	
		1900'o. R.I.	1900'o. R.I.	R.A. 1900'o. h m s	N. Dec. 1900. ° ' "
131	6	15°16'75	3°24'36	3 25 59.45	43 11 12.3
132*	15	15°36'78	6°06'02	26 5 20	25 17.0
133	6	15°47'97	4°44'07	26 8.12	17 11.1
134	10	15°47'67	7°20'63	26 8.30	31 0.7
135	6	15°47'05	9°6'744	26 8.37	43 21.1
136	8	15°57'93	7°60'33	26 11.17	32 59.6
137	14	15°58'73	5°64'28	26 11.20	23 11.5
138	6	15°63'01	7°96'57	26 12.61	34 48.3
139	11	15°62'48	12°45'11	26 12.92	57 13.9
140	8	15°64'18	9°68'90	26 13.11	43 25.3
141	11	15°65'09	12°90'37	26 13.69	59 29.6
142*	22	15°68'53	4°15'53	26 13.74	15 45.2
143	8	15°79'43	3°63'61	26 16.68	13 9.4
144	12	15°79'59	10°38'46	26 17.45	46 53.8
145	8	15°82'16	4°88'06	26 17.56	19 22.7
146	10	15°80'24	12°82'68	26 17.90	59 6.4
147	7	15°85'94	12°65'33	26 19.46	58 14.3
148	19	15°96'96	10°82'86	26 22.31	49 6.8
149	9	16°04'21	8°35'44	26 24.03	36 44.4
150	8	16°18'22	4°70'90	26 27.46	18 30.8
151	6	16°29'40	8°34'78	26 30.99	36 42.1
152	9	16°31'05	11°20'22	26 31.81	50 58.4
153	9	16°36'34	9°63'09	26 33.07	43 6.9
154	12	16°42'51	4°91'72	26 34.16	19 32.9
155	6	16°49'82	3°97'12	26 36.04	14 46.0
156	6	16°48'96	9°03'73	26 36.48	40 8.7
157	9	16°59'15	8°25'46	26 39.19	36 13.8
158	6	16°70'32	9°75'61	26 42.49	43 44.0
159	7	16°70'79	12°43'99	3 26 43.01	43 57 9.1

Some years ago I was engaged in making estimations of *Nova Aurigæ* when it fell below the ninth to the 13.5 magnitude ; the accurate or even approximate positions of the surrounding stars were not to be found in any catalogue, the faintness of most of the stars used for comparison rendered their observation with the transit circle impossible ; one had thus to resort to the

less accurate and very tedious process of determining their positions by means of a lower power eyepiece furnished with a ring, letter N, or cross-bar micrometer, which would permit observation of faint stars in a dark field. I remember giving many fine nights, spread over some weeks, to approximately fixing the positions of a comparatively small number of stars about the *Nova*, and I likewise spent a good deal of time for the same purpose in the region surrounding the supposed position of Tycho Brahe's *Nova* of 1572, and intended to proceed in a similar way with other regions about "new" stars; but the tediousness of those methods of observation did not seem to justify one, in view of other and more important work, in expending more time over it, so it was never completed.

With modern methods which have rendered such work so easy I could not let pass the opportunity of securing *photographs* of *Nova Persei* and neighbouring stars at the earliest possible moment.

Observations of the New Star in Perseus made at the Radcliffe Observatory, Oxford.

(Communicated by Arthur A. Rambaut, M.A., Sc.D., F.R.S.,
Radcliffe Observer.)

Since the receipt of the telegram announcing its discovery, observations have been made of Dr. Anderson's new star at the Radcliffe Observatory on every evening that the weather permitted.

On February 23 and 24 the sky was almost continuously overcast, and the star was not seen by us until the evening of the 25th. At this time its magnitude appeared to be 0.9.

The observations include transit-circle determinations of the position of the star on four afternoons, a spectroscopic examination of the light on two evenings, measures of its brightness made with a wedge photometer, and eye-estimates of its brightness as compared with several of the brighter stars.

The transit-circle observations and photometric measures will be published in due time when they have been more fully discussed. The present notice is chiefly concerned with the eye-estimates of magnitude.

In making these comparisons the magnitudes of the Harvard Photometry have been adopted, and the observers have estimated the difference between the *Nova* and each comparison star in tenths of a magnitude. In the results given below no correction has been applied for the atmospheric absorption of light, but as, for the most part, the comparison stars have been taken at various altitudes both above and below the *Nova*, the effect of the absorption